

114TH CONGRESS
1ST SESSION

H. R. 1561

IN THE SENATE OF THE UNITED STATES

MAY 20, 2015

Received; read twice and referred to the Committee on Commerce, Science,
and Transportation

AN ACT

To improve the National Oceanic and Atmospheric Administration's weather research through a focused program of investment on affordable and attainable advances in observational, computing, and modeling capabilities to support substantial improvement in weather forecasting and prediction of high impact weather events, to expand commercial opportunities for the provision of weather data, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Weather Research and
5 Forecasting Innovation Act of 2015”.

6 **SEC. 2. PUBLIC SAFETY PRIORITY.**

7 In accordance with NOAA’s critical mission to pro-
8 vide science, service, and stewardship, the Under Sec-
9 retary shall prioritize weather research, across all weather
10 programs, to improve weather data, forecasts, and warn-
11 ings for the protection of life and property and the en-
12 hancement of the national economy.

13 **SEC. 3. WEATHER RESEARCH AND FORECASTING INNOVA-**
14 **TION.**

15 (a) PROGRAM.—The Assistant Administrator for
16 OAR shall conduct a program to develop improved under-
17 standing of and forecast capabilities for atmospheric
18 events and their impacts, placing priority on developing
19 more accurate, timely, and effective warnings and fore-
20 casts of high impact weather events that endanger life and
21 property.

22 (b) PROGRAM ELEMENTS.—The program described
23 in subsection (a) shall focus on the following activities:

24 (1) Improving the fundamental understanding
25 of weather consistent with section 2, including the

1 boundary layer and other atmospheric processes af-
2 fecting high impact weather events.

3 (2) Improving the understanding of how the
4 public receives, interprets, and responds to warnings
5 and forecasts of high impact weather events that en-
6 danger life and property.

7 (3) Research and development, and transfer of
8 knowledge, technologies, and applications to the
9 NWS and other appropriate agencies and entities,
10 including the American weather industry and aca-
11 demic partners, related to—

12 (A) advanced radar, radar networking
13 technologies, and other ground-based tech-
14 nologies, including those emphasizing rapid,
15 fine-scale sensing of the boundary layer and
16 lower troposphere, and the use of innovative,
17 dual-polarization, phased array technologies;

18 (B) aerial weather observing systems;

19 (C) high performance computing and infor-
20 mation technology and wireless communication
21 networks;

22 (D) advanced numerical weather prediction
23 systems and forecasting tools and techniques
24 that improve the forecasting of timing, track,

1 intensity, and severity of high impact weather,
2 including through—
3 (i) the development of more effective
4 mesoscale models;
5 (ii) more effective use of existing, and
6 the development of new, regional and na-
7 tional cloud-resolving models;
8 (iii) enhanced global weather models;
9 and
10 (iv) integrated assessment models;
11 (E) quantitative assessment tools for meas-
12 uring the impact and value of data and observ-
13 ing systems, including OSSEs (as described in
14 section 8), OSEs, and AOAs;
15 (F) atmospheric chemistry and interactions
16 essential to accurately characterizing atmos-
17 pheric composition and predicting meteorolog-
18 ical processes, including cloud microphysical,
19 precipitation, and atmospheric electrification
20 processes, to more effectively understand their
21 role in severe weather; and
22 (G) additional sources of weather data and
23 information, including commercial observing
24 systems.

11 (c) EXTRAMURAL RESEARCH.—

20 (2) SENSE OF CONGRESS.—It is the sense of
21 Congress that not less than 30 percent of the funds
22 for weather research and development at OAR
23 should be made available for the purpose described
24 in paragraph (1).

1 (d) REPORT.—The Under Secretary shall transmit to
2 Congress annually, concurrently with NOAA's budget re-
3 quest, a description of current and planned activities
4 under this section.

5 **SEC. 4. TORNADO WARNING IMPROVEMENT AND EXTEN-**
6 **SION PROGRAM.**

7 (a) IN GENERAL.—The Under Secretary, in collabora-
8 tion with the American weather industry and academic
9 partners, shall establish a tornado warning improvement
10 and extension program.

11 (b) GOAL.—The goal of such program shall be to re-
12 duce the loss of life and economic losses from tornadoes
13 through the development and extension of accurate, effec-
14 tive, and timely tornado forecasts, predictions, and warn-
15 ings, including the prediction of tornadoes beyond one
16 hour in advance.

17 (c) PROGRAM PLAN.—Not later than 6 months after
18 the date of enactment of this Act, the Assistant Adminis-
19 trator for OAR, in coordination with the Assistant Admin-
20 istrator for NWS, shall develop a program plan that de-
21 tails the specific research, development, and technology
22 transfer activities, as well as corresponding resources and
23 timelines, necessary to achieve the program goal.

24 (d) BUDGET FOR PLAN.—Following completion of
25 the plan, the Under Secretary, acting through the Assist-

1 ant Administrator for OAR, in coordination with the As-
2 sistant Administrator for NWS, shall transmit annually
3 to Congress a proposed budget corresponding to the activi-
4 ties identified in the plan.

5 **SEC. 5. HURRICANE FORECAST IMPROVEMENT PROGRAM.**

6 (a) IN GENERAL.—The Under Secretary, in collabo-
7 ration with the American weather industry and academic
8 partners, shall maintain the Hurricane Forecast Improve-
9 ment Program (HFIP).

10 (b) GOAL.—The goal of such program shall be to de-
11 velop and extend accurate hurricane forecasts and warn-
12 ings in order to reduce loss of life, injury, and damage
13 to the economy.

14 (c) PROGRAM PLAN.—Not later than 6 months after
15 the date of enactment of this Act, the Assistant Adminis-
16 trator for OAR, in consultation with the Assistant Adminis-
17 trator for NWS, shall develop a program plan that de-
18 tails the specific research, development, and technology
19 transfer activities, as well as corresponding resources and
20 timelines, necessary to achieve the program goal.

21 (d) BUDGET FOR PLAN.—Following completion of
22 the plan, the Under Secretary, acting through the Assis-
23 tant Administrator for OAR, in consultation with the As-
24 sistant Administrator for NWS, shall transmit annually

- 1 to Congress a proposed budget corresponding to the activi-
- 2 ties identified in the plan.

3 **SEC. 6. WEATHER RESEARCH AND DEVELOPMENT PLAN-**

4 **NING.**

5 Not later than 6 months after the date of enactment
6 of this Act, and annually thereafter, the Under Secretary,
7 acting through the Assistant Administrator for OAR, in
8 coordination with the Assistant Administrators for NWS
9 and NESDIS, shall issue a research and development and
10 research to operations plan to restore and maintain
11 United States leadership in numerical weather prediction
12 and forecasting that—

13 (1) describes the forecasting skill and tech-
14 nology goals, objectives, and progress of NOAA in
15 carrying out the program conducted under section 3;

16 (2) identifies and prioritizes specific research
17 and development activities, and performance metrics,
18 weighted to meet the operational weather mission of
19 NWS to achieve a weather-ready Nation;

20 (3) describes how the program will collaborate
21 with stakeholders, including the American weather
22 industry and academic partners; and

23 (4) identifies, through consultation with the Na-
24 tional Science Foundation, American weather indus-
25 try, and academic partners, research necessary to

1 enhance the integration of social science knowledge
2 into weather forecast and warning processes, includ-
3 ing to improve the communication of threat informa-
4 tion necessary to enable improved severe weather
5 planning and decisionmaking on the part of individ-
6 uals and communities.

7 **SEC. 7. OBSERVING SYSTEM PLANNING.**

8 The Under Secretary shall—

9 (1) develop and maintain a prioritized list of
10 observation data requirements necessary to ensure
11 weather forecasting capabilities to protect life and
12 property to the maximum extent practicable;

13 (2) undertake, using OSSEs, OSEs, AOAs, and
14 other appropriate assessment tools, ongoing system-
15 atic evaluations of the combination of observing sys-
16 tems, data, and information needed to meet the re-
17 quirements listed under paragraph (1), assessing
18 various options to maximize observational capabili-
19 ties and their cost-effectiveness;

20 (3) identify current and potential future data
21 gaps in observing capabilities related to the require-
22 ments listed under paragraph (1); and

23 (4) determine a range of options to address
24 gaps identified under paragraph (3).

1 **SEC. 8. OBSERVING SYSTEM SIMULATION EXPERIMENTS.**

2 (a) IN GENERAL.—In support of the requirements of
3 section 7, the Assistant Administrator for OAR shall un-
4 dertake OSSEs to quantitatively assess the relative value
5 and benefits of observing capabilities and systems. Tech-
6 nical and scientific OSSE evaluations—

7 (1) may include assessments of the impact of
8 observing capabilities on—

9 (A) global weather prediction;

10 (B) hurricane track and intensity fore-
11 casting;

12 (C) tornado warning lead times and accu-
13 racy;

14 (D) prediction of mid-latitude severe local
15 storm outbreaks; and

16 (E) prediction of storms that have the po-
17 tential to cause extreme precipitation and flood-
18 ing lasting from 6 hours to 1 week; and

19 (2) shall be conducted in cooperation with other
20 appropriate entities within NOAA, other Federal
21 agencies, the American weather industry, and aca-
22 demic partners to ensure the technical and scientific
23 merit of OSSE results.

24 (b) REQUIREMENTS.—OSSEs shall quantitatively—

25 (1) determine the potential impact of proposed
26 space-based, suborbital, and in situ observing sys-

1 tems on analyses and forecasts, including potential
2 impacts on extreme weather events across all parts
3 of the Nation;

4 (2) evaluate and compare observing system de-
5 sign options; and

6 (3) assess the relative capabilities and costs of
7 various observing systems and combinations of ob-
8 serving systems in providing data necessary to pro-
9 tect life and property.

10 (c) IMPLEMENTATION.—OSSEs—

11 (1) shall be conducted prior to the acquisition
12 of major Government-owned or Government-leased
13 operational observing systems, including polar-orbiting
14 and geostationary satellite systems, with a
15 lifecycle cost of more than \$500,000,000; and

16 (2) shall be conducted prior to the purchase of
17 any major new commercially provided data with a
18 lifecycle cost of more than \$500,000,000.

19 (d) PRIORITY OSSES.—

20 (1) GLOBAL NAVIGATION SATELLITE SYSTEM
21 RADIO OCCULTATION.—Not later than December 31,
22 2015, the Assistant Administrator for OAR shall
23 complete an OSSE to assess the value of data from
24 Global Navigation Satellite System Radio Occulta-
25 tion.

(2) GEOSTATIONARY HYPERSPECTRAL SOUNDER GLOBAL CONSTELLATION.—Not later than December 31, 2016, the Assistant Administrator for OAR shall complete an OSSE to assess the value of data from a geostationary hyperspectral sounder global constellation.

7 (e) RESULTS.—Upon completion of all OSSEs, re-
8 sults shall be publicly released and accompanied by an as-
9 sessment of related private and public sector weather data
10 sourcing options, including their availability, affordability,
11 and cost effectiveness. Such assessments shall be devel-
12 oped in accordance with section 50503 of title 51, United
13 States Code.

14 SEC. 9. COMPUTING RESOURCES PRIORITIZATION REPORT.

15 Not later than 12 months after the date of enactment
16 of this Act, and annually thereafter, the Under Secretary,
17 acting through the NOAA Chief Information Officer, in
18 coordination with the Assistant Administrator for OAR
19 and the Assistant Administrator for NWS, shall produce
20 and make publicly available a report that explains how
21 NOAA intends to—

22 (1) continually support upgrades to pursue the
23 fastest, most powerful, and cost effective high per-
24 formance computing technologies in support of its
25 weather prediction mission;

1 (2) ensure a balance between the research to
2 operations requirements to develop the next genera-
3 tion of regional and global models as well as highly
4 reliable operational models;

5 (3) take advantage of advanced development
6 concepts to, as appropriate, make next generation
7 weather prediction models available in beta-test
8 mode to operational forecasters, the American
9 weather industry, and partners in academic and gov-
10 ernment research; and

11 (4) use existing computing resources to improve
12 advanced research and operational weather pre-
13 diction.

14 **SEC. 10. COMMERCIAL WEATHER DATA.**

15 (a) AMENDMENT.—Section 60161 of title 51, United
16 States Code, is amended by adding at the end the fol-
17 lowing: “This prohibition shall not extend to—

18 “(1) the purchase of weather data through con-
19 tracts with commercial providers; or

20 “(2) the placement of weather satellite instru-
21 ments on cohosted government or private payloads.”.

22 (b) STRATEGY.—

23 (1) IN GENERAL.—Not later than 6 months
24 after the date of enactment of this Act, the Sec-
25 retary of Commerce, in consultation with the Under

1 Secretary, shall transmit to the Committee on
2 Science, Space, and Technology of the House of
3 Representatives and the Committee on Commerce,
4 Science, and Transportation of the Senate a strategy
5 to enable the procurement of quality commercial
6 weather data. The strategy shall assess the range of
7 commercial opportunities, including public-private
8 partnerships, for obtaining surface-based, aviation-
9 based, and space-based weather observations. The
10 strategy shall include the expected cost effectiveness
11 of these opportunities as well as provide a plan for
12 procuring data, including an expected implementa-
13 tion timeline, from these nongovernmental sources,
14 as appropriate.

15 (2) REQUIREMENTS.—The strategy shall in-
16 clude—

17 (A) an analysis of financial or other bene-
18 fits to, and risks associated with, acquiring
19 commercial weather data or services, including
20 through multiyear acquisition approaches;

21 (B) an identification of methods to address
22 planning, programming, budgeting, and execu-
23 tion challenges to such approaches, including—

24 (i) how standards will be set to ensure
25 that data is reliable and effective;

(ii) how data may be acquired through commercial experimental or innovative techniques and then evaluated for integration into operational use;

(iii) how to guarantee public access to all forecast-critical data to ensure that the American weather industry and the public continue to have access to information critical to their work; and

(iv) in accordance with section 50503 of title 51, United States Code, methods to address potential termination liability or cancellation costs associated with weather data or service contracts; and

(C) an identification of any changes needed in the requirements development and approval processes of the Department of Commerce to facilitate effective and efficient implementation of such strategy.

24 (c) PILOT PROGRAM.—

1 (1) CRITERIA.—Not later than December 31,
2 2015, NOAA shall publish data standards and speci-
3 fications for space-based commercial weather data.

4 (2) PILOT CONTRACT.—

5 (A) CONTRACT.—Not later than October
6 1, 2016, NOAA shall, through an open competi-
7 tion, enter into at least one pilot contract with
8 a private sector entity capable of providing data
9 that meet the standards and specifications set
10 by NOAA to provide commercial weather data
11 in a manner that allows NOAA to calibrate and
12 evaluate the data.

13 (B) ASSESSMENT OF DATA VIABILITY.—
14 Not later than October 1, 2019, NOAA shall
15 transmit to Congress the results of a deter-
16 mination of the extent to which data provided
17 under the contract entered into under subpara-
18 graph (A) meet the criteria published under
19 paragraph (1).

20 (3) OBTAINING FUTURE DATA.—NOAA shall,
21 to the extent feasible, obtain commercial weather
22 data from private sector providers.

23 (4) AUTHORIZATION OF APPROPRIATIONS.—
24 There are authorized to be appropriated out of funds
25 made available for procurement, acquisition, and

1 construction at NESDIS, \$9,000,000 for carrying
2 out this subsection.

3 **SEC. 11. ENVIRONMENTAL INFORMATION SERVICES WORK-**
4 **ING GROUP.**

5 (a) ESTABLISHMENT.—The NOAA Science Advisory
6 Board shall continue to maintain a standing working
7 group named the Environmental Information Services
8 Working Group (in this section referred to as the “Work-
9 ing Group”) to—

10 (1) provide advice for prioritizing weather re-
11 search initiatives at NOAA to produce real improve-
12 ment in weather forecasting;

13 (2) provide advice on existing or emerging tech-
14 nologies or techniques that can be found in private
15 industry or the research community that could be in-
16 corporated into forecasting at NWS to improve fore-
17 casting skill;

18 (3) identify opportunities to improve commu-
19 nications between weather forecasters, Federal,
20 State, local, tribal, and other emergency manage-
21 ment personnel, and the public; and to improve com-
22 munications and partnerships among NOAA and the
23 private and academic sectors; and

24 (4) address such other matters as the Science
25 Advisory Board requests of the Working Group.

1 (b) COMPOSITION.—

2 (1) IN GENERAL.—The Working Group shall be
3 composed of leading experts and innovators from all
4 relevant fields of science and engineering including
5 atmospheric chemistry, atmospheric physics, meteor-
6 ology, hydrology, social science, risk communica-
7 tions, electrical engineering, and computer sciences.
8 In carrying out this section, the Working Group may
9 organize into subpanels.

10 (2) NUMBER.—The Working Group shall be
11 composed of no fewer than 15 members. Nominees
12 for the Working Group may be forwarded by the
13 Working Group for approval by the Science Advisory
14 Board. Members of the Working Group may choose
15 a chair (or co-chairs) from among their number with
16 approval by the Science Advisory Board.

17 (c) ANNUAL REPORT.—The Working Group shall
18 transmit annually to the Science Advisory Board for sub-
19 mission to the Under Secretary a report on progress made
20 by NOAA in adopting the Working Group's recommenda-
21 tions. The Science Advisory Board shall transmit this re-
22 port to the Under Secretary. Within 30 days of receipt
23 of such report, the Under Secretary shall transmit it to
24 the Committee on Science, Space, and Technology of the

1 House of Representatives and the Committee on Com-
2 merce, Science, and Transportation of the Senate.

3 **SEC. 12. INTERAGENCY WEATHER RESEARCH AND INNOVA-
4 TION COORDINATION.**

5 (a) ESTABLISHMENT.—The Director of the Office of
6 Science and Technology Policy shall establish an Inter-
7 agency Committee for Advancing Weather Services to im-
8 prove coordination of relevant weather research and fore-
9 cast innovation activities across the Federal Government.

10 The Interagency Committee shall—

11 (1) include participation by the National Aero-
12 nautics and Space Administration, the Federal Avia-
13 tion Administration, NOAA and its constituent ele-
14 ments, the National Science Foundation, and such
15 other agencies involved in weather forecasting re-
16 search as the President determines are appropriate;

17 (2) identify and prioritize top forecast needs
18 and coordinate those needs against budget requests
19 and program initiatives across participating offices
20 and agencies; and

21 (3) share information regarding operational
22 needs and forecasting improvements across relevant
23 agencies.

24 (b) Co-CHAIR.—The Federal Coordinator for Meteor-
25 ology shall serve as a co-chair of this panel.

1 (c) FURTHER COORDINATION.—The Director shall
2 take such other steps as are necessary to coordinate the
3 activities of the Federal Government with those of the
4 American weather industry, State governments, emer-
5 gency managers, and academic researchers.

6 **SEC. 13. OAR AND NWS EXCHANGE PROGRAM.**

7 (a) IN GENERAL.—The Assistant Administrator for
8 OAR and the Assistant Administrator for NWS may es-
9 tablish a program to detail OAR personnel to the NWS
10 and NWS personnel to OAR.

11 (b) GOAL.—The goal of this program is to enhance
12 forecasting innovation through regular, direct interaction
13 between OAR's world-class scientists and NWS's oper-
14 ational staff.

15 (c) ELEMENTS.—The program shall allow up to 10
16 OAR staff and NWS staff to spend up to 1 year on detail.
17 Candidates shall be jointly selected by the Assistant Ad-
18 ministrator for OAR and the Assistant Administrator for
19 NWS.

20 (d) REPORT.—The Under Secretary shall report an-
21 nually to the Committee on Science, Space, and Tech-
22 nology of the House of Representatives and to the Com-
23 mittee on Commerce, Science, and Transportation of the
24 Senate on participation in such program and shall high-
25 light any innovations that come from this interaction.

1 SEC. 14. VISITING FELLOWS AT NWS.

2 (a) IN GENERAL.—The Assistant Administrator for
3 NWS may establish a program to host postdoctoral fellows
4 and academic researchers at any of the National Centers
5 for Environmental Prediction.

(b) GOAL.—This program shall be designed to provide direct interaction between forecasters and talented academic and private sector researchers in an effort to bring innovation to forecasting tools and techniques available to the NWS.

11 (c) SELECTION AND APPOINTMENT.—Such fellows
12 shall be competitively selected and appointed for a term
13 not to exceed 1 year.

14 SEC. 15. NOAA WEATHER READY ALL HAZARDS AWARD
15 PROGRAM.

16 (a) PROGRAM.—The Assistant Administrator for
17 NWS is authorized to establish the NOAA Weather Ready
18 All Hazards Award Program. This award program shall
19 provide annual awards to honor individuals or organiza-
20 tions that use or provide NOAA Weather Radio All Haz-
21 ards receivers or transmitters to save lives and protect
22 property. Individuals or organizations that utilize other
23 early warning tools or applications also qualify for this
24 award.

25 (b) GOAL.—This award program draws attention to
26 the life-saving work of the NOAA Weather Ready All Haz-

1 ards Program, as well as emerging tools and applications,
2 that provide real-time warning to individuals and commu-
3 nities of severe weather or other hazardous conditions.

4 (c) PROGRAM ELEMENTS.—

5 (1) NOMINATIONS.—Nominations for this
6 award shall be made annually by the Weather Field
7 Offices to the Assistant Administrator for NWS.
8 Broadcast meteorologists, weather radio manufactur-
9 ers and weather warning tool and application devel-
10 opers, emergency managers and public safety offi-
11 cials may nominate individuals and/or organizations
12 to their local Weather Field Offices, but the final list
13 of award nominees must come from the Weather
14 Field Offices.

15 (2) SELECTION OF AWARDEES.—Annually, the
16 Assistant Administrator for NWS shall choose win-
17 ners of this award whose timely actions, based on
18 NOAA weather radio all hazards receivers or trans-
19 mitters or other early warning tools and applica-
20 tions, saved lives and/or property or demonstrated
21 public service in support of weather or all hazard
22 warnings.

23 (3) AWARD CEREMONY.—The Assistant Admin-
24 istrator for NWS shall establish a means of making
25 these awards to provide maximum public awareness

1 of the importance of NOAA Weather Radio, and
2 such other warning tools and applications as are
3 represented in the awards.

4 **SEC. 16. DEFINITIONS.**

5 In this Act:

6 (1) AOA.—The term “AOA” means an Analy-
7 sis of Alternatives.

8 (2) NESDIS.—The term “NESDIS” means
9 the National Environmental Satellite, Data, and In-
10 formation Service.

11 (3) NOAA.—The term “NOAA” means the Na-
12 tional Oceanic and Atmospheric Administration.

13 (4) NWS.—The term “NWS” means the Na-
14 tional Weather Service.

15 (5) OAR.—The term “OAR” means the Office
16 of Oceanic and Atmospheric Research.

17 (6) OSE.—The term “OSE” means an Observ-
18 ing System Experiment.

19 (7) OSSE.—The term “OSSE” means an Ob-
20 serving System Simulation Experiment.

21 (8) UNDER SECRETARY.—The term “Under
22 Secretary” means the Under Secretary of Commerce
23 for Oceans and Atmosphere.

1 **SEC. 17. AUTHORIZATION OF APPROPRIATIONS.**

2 (a) FISCAL YEAR 2015.—There are authorized to be
3 appropriated for fiscal year 2015—

4 (1) \$90,800,000 to OAR to carry out this Act,
5 of which—

6 (A) \$70,000,000 is authorized for weather
7 laboratories and cooperative institutes; and

8 (B) \$20,800,000 is authorized for weather
9 and air chemistry research programs; and

10 (2) out of funds made available for research
11 and development at NOAA, an additional amount of
12 \$16,000,000 for OAR to carry out the joint tech-
13 nology transfer initiative described in section
14 3(b)(4).

15 (b) FISCAL YEARS 2016 AND 2017.—For each of fis-
16 cal years 2016 and 2017, there are authorized to be ap-
17 propriated to OAR—

18 (1) \$100,000,000 to carry out this Act, of
19 which—

20 (A) \$80,000,000 is authorized for weather
21 laboratories and cooperative institutes; and

22 (B) \$20,000,000 is authorized for weather
23 and air chemistry research programs; and

24 (2) an additional amount of \$20,000,000 for
25 the joint technology transfer initiative described in
26 section 3(b)(4).

1 (c) LIMITATION.—No additional funds are authorized
2 to carry out this Act, and the amendments made by this
3 Act.

Passed the House of Representatives May 19, 2015.

Attest: KAREN L. HAAS,

Clerk.